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West Europe Report

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ENERGY

SOLAR SATELLITE ENERGY RECEIVING STATIONS IN NORTH SEA

Oslo AFTENPOSTEN in Norwegian 17 Feb 81 p 9

[Article by Per Nordrum]

[Text] Brussels, 16 Feb--Soon after the year 2000 the electricity needs of most of western Europe could come from "energy dikes" and "energy islands" out at sea. It should be possible to collect rays from a solar energy satellite on these artificially-constructed energy areas and transform them into electricity which can then be "brought ashore."

This appears in an extremely interesting study made by the Dutch firm Hydronamic at the request of the European Space Agency (ESA). It suggests that the first "energy dike" be built 60 kilometers out in the North Sea on a level with Den Helder in The Netherlands.

Building a facility out at sea will be an enormous and expensive job. At that point the North Sea is about 27 meters deep and Hydronamic favors a dike of 50 kilometers with a drained surface of roughly 174 square kilometers within the large embankment. In other places it might be better to fill in and get entire islands instead. Since the Dutch are experts in constructing dikes it is assumed that they have the necessary technology to embark on an enormous project like the one under discussion here.

It is estimated that the dike off Den Helder would cost 25 billion kroner and it would take 8 1/2 years to complete the job.

Both American and European space experts have been studying solar energy satellites for several years. Such satellites would have to be very large structures with solar panels measuring several dozen square kilometers according to the Dutch study. Obviously it will not be easy to put something like this in position out in space.

The idea is to ship the necessary parts and technical construction aids into space on a space ship of the Space Shuttle type. The first American Space Shuttle will go on its first voyage sometime this spring.

The calculations, which were made recently, show that solar energy satellites could produce electricity at economical prices. But there is a great deal of uncertainty about the technical feasibility of carrying out such a project. And so far there is no overall survey of the environmental hazards.

The electricity produced will be sent to earth in the form of microwaves. Down on the energy dikes and islands there will be whole forests of antennae to receive the microwaves and transform them into ordinary electricity before the energy is "brought ashore."

Microwaves can be dangerous to living organisms. Therefore big receiver facilities cannot be located close to population centers. The population density on the European continent makes it difficult to find sites far enough away from populated areas where one can build antenna forests measuring several square kilometers. That is why the southern areas of the North Sea are now being suggested. From there the transmission to the densely-populated industrial regions in northwestern Europe will be over relatively short distances.

The amount of energy from a large nuclear power plant would be very small compared to what experts believe can be obtained from an antenna forest on an energy dike. They are talking about 5000 megawatts. It would take five of today's large nuclear power plants to produce a similar amount.

The Hydronamic report also mentions other possibilities for producing energy with gigantic facilities out in the North Sea. Wind power and tide and wave power could be good auxiliary energy sources.

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NORSK HYDRO'S ALTERNATE-FUELS PROGRAM ENTERS NEW PHASE

Oslo AFTENPOSTEN in Norwegian 18 Feb 81 p 28

[Text] Norsk Hydro's test in Denmark of alternative fuels is now entering a new phase. The methanol content in the gasoline for test cars is being increased from 4 to 15 percent. In addition a new fuel test is being started with a mixture of a different additive called MTBE [expansion unknown]. This test will be conducted side by side with the methanol test according to a press release from Hydro.

MTBE is a high-octane product that can be used to reduce the lead content of gasoline, thus reducing the environmental pollution from car exhaust emission. MTBE is produced from methanol and hydrocarbons in a chemical process and is one of the substances being considered for production if the Mongstad refinery is expanded.

The tests on alternative fuels are part of Hydro's research program in the energy sector. The company also participates in the Norwegian Methanol Group which is pursuing methanol research in Norway. However Hydro is alone in conducting the methanol tests in Denmark.

The first phase of the test which started last fall must be described as successful. No technical problems were encountered with vehicles or with regard to distribution. The final summing up of the technical automotive aspects of the test will be made by the Technological Institute in Copenhagen.

Two Viking stations in Copenhagen are being used for the fuel tests. The stations belong to the Skanbenzin gasoline company which has 135 gas stations all over Denmark. Hydro owns a half interest in Skanbenzin and delivers products to the chain of gas stations.

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ENERGY

UNDERGROUND COAL GASIFICATION TECHNOLOGY ADVANCES

Paris AFP SCIENCES in French 29 Jan 81 pp 52-56

[Text] Paris--New Experiments on Coal Gasification in France. After the "encouraging" results obtained in the north at Bruay-en-Artois, further experiments on coal gasification, a process for working deep reserves, are going to be conducted this year in France in the Lorraine and Center-South basins.

The coal resources, inaccessible under present working conditions in the mines and possibly utilizable with this process that French experts have been studying for 2 years now, amount to 2 billion metric tons. But it is necessary to wait at least 3 more years, in order to achieve the technical knowledge required for a decision on industrial exploitation, according to what was stated on 27 January by the persons in charge of the Underground Gasification Study Group (GEGS).

A 125-million-franc program has been provided for the 1980-1981 period and experiments are going to be performed this year at Faulquemont, in Lorraine, at a depth of 1,200 meters and at Echaux, near Saint-Etienne, at about only 30 meters below the surface. A second experiment is already underway at Bruay-en-Artois where "undeniably successful results" were achieved in 1980, according to the GECS. After injecting nitrogen into a shaft, production of carbon dioxide amounting to 30 percent was obtained in another shaft located at a distance of 50 meters.

The GEGS includes the French Gas Company, French Coal-mining Company, French Petroleum Institute and the Bureau of Geological and Mining Research, which are financing, in equal shares, 30 percent of the research program on coal gasification. The European Community is the principal financier with 40 percent and the French State grants the remaining 30 percent through the General Delegation for Scientific and Technical Research.

Before being able to make a decision on utilization of this process in France, the GEGS experts have to proceed, in addition, to conduct experiments in a pilot site that has not yet been found. "It is a very complicated task to carry out," the official in charge of the operation in the French Gas Company, Pierre Gaussens, admitted.

"We shall be able to make a decision of these experiments in 3 years. Then we shall give you some good or bad news," Gaussens told the newsmen.

The Soviet Union is already using this gasification process for exploiting its huge coal resources, but the strata exploited are less deep. The gas obtained has low calorific value and has to be used on the spot for the production of electricity in a powerplant. Experiments at great depth, as in France, are also being conducted in Belgium near the French border and in the Federal Republic of Germany.

Concerning the Topic of Establishment and Improvement of the Initial Link

The studies involved experimental approaches to the phenomena of hydraulic fracturing on samples kept under stress, models of hydraulic fracturing procedures, tests on chemical breakdown of coal or for determining the electrical properties of various types of coal with a view to electrocarbonization.

Concerning the Topic of the Gasification Process

The laboratory studies undertaken result from the first economic evaluations of the underground gasification process.

A method of system analysis was used to recognize the various chemical, mechanical, physical phenomena whose evolution participates in development of the gasified area.

It is based on schematic modeling that led to singling out three distinct zones on the course of the gas:

[1.] The zone near the shaft around which the phenomena of exothermic oxidation occur. The chamber thus formed, whose walls give rise to heat losses, is limited by the coal front in reaction with the gaseous mass consisting primarily of CO_2 and O_2.

[2.] The active part of the linking channel in which hot CO_2 and H_2O are transformed in part in CO and H_2.

[3.] The inert part of the channel where the wall has a temperature lower than the temperature of kinetic stoppage of the reduction, because it is insufficiently heated by the stream of gas.

Theoretical and experimental laboratory studies are in progress on these three zones. Special attention is being paid to the phenomena occuring in the retrocombustion phase.

Functional schematization will be supplemented by modeling or partial experiments on phenomena capable of occuring during gasification strictly speaking.

(Sketches made by the Underground Gasification Study Group).

The principle of gasification on the spot consists successively of the following:

[1.] Establishment in the naturally compact coal of a sufficient permeability communication between two shafts several dozen meters apart, so that the gasifying agent can be injected then in the desired flow.

[2.] Gasification of the coal by injection of the gasifying agent in one of the shafts and collecting the gas produced in the other shaft.

The first series of on-the-spot experiments performed at Bruay-en-Artois in 1979 and 1980 aimed at establishing communication between two shafts. The method selected for this initial attempt involved 2 steps:

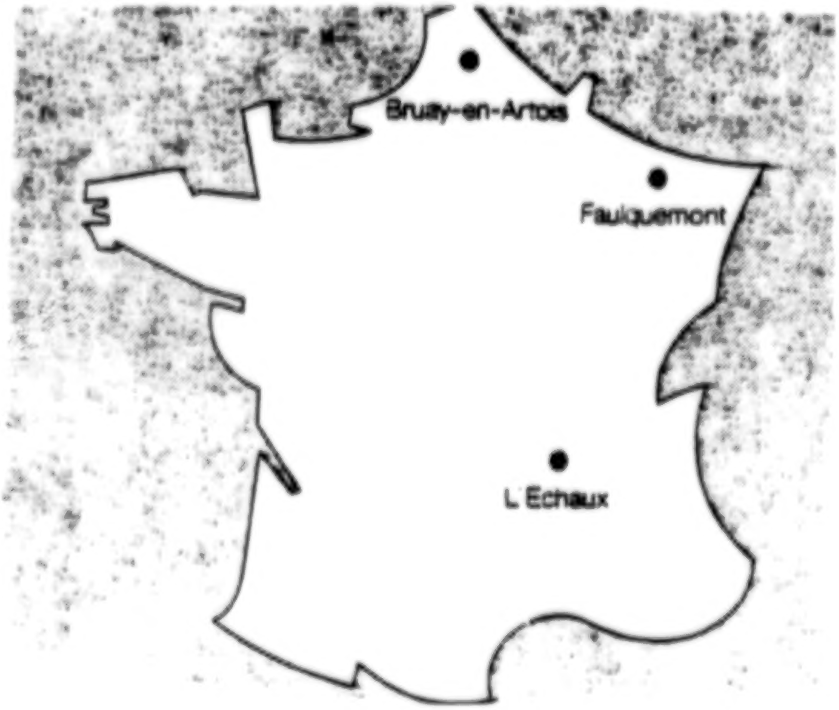
[1.] Prelinking by fracturing furnishing minimum communication between the shafts. This was accomplished in two phases:

[a.] Slow injection under pressure increasing from 100 to 300 bars by means of mine pumps ordinarily used for supplying the hydraulic circuits of the supports.

[b.] Fracturing under heavy pressure and high rate of flow (500 bars, 1 cubic meter a minute) performed in March 1980 with equipment normally used for fracturing operations of oil-bearing strata.

Successful prelinking by fracturing, making it possible to have a considerable amount of fluid circulate in a coal stratum located at a depth of 1,200 meters, had never been achieved up to that time.

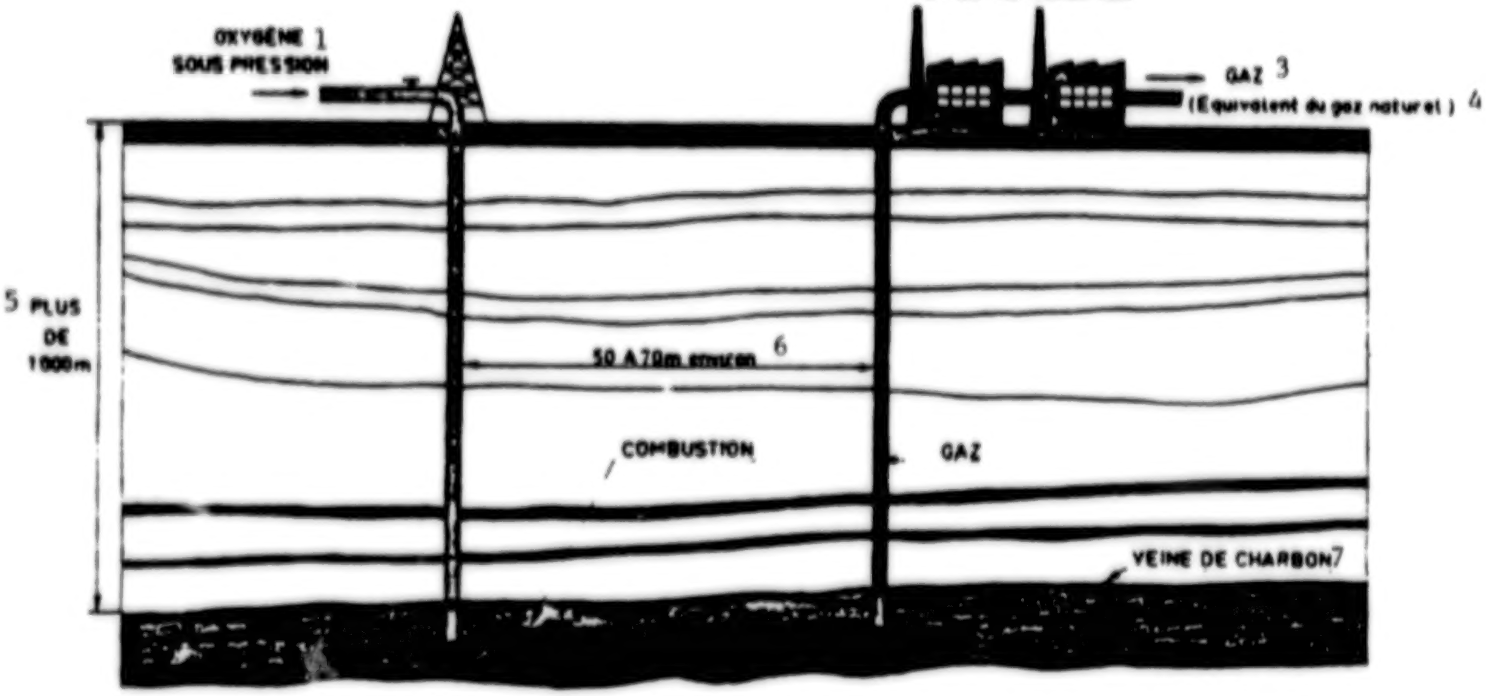
Location of the Sites



[2.] Enlargement and obtention of permanent linking by retrocombustion.

This successful prelinking by fracturing encouraged GEGS to start, in July 1980, a first attempt at ignition and retrocombustion with air undertaken at a great depth. Ignition was accomplished by means of an electric ignition device designed and developed by GEGS. Combustion continued for about 2 weeks at a low rate of flow and was stopped for logistic reasons inherent in the mine, and in the injection and measurement materials available. It will be resumed on the same site, at Bruay-en-Artois, at the beginning of 1981 with improved and more powerful equipment. This test is the first achievement of this kind at a depth of over 1,000 meters.

Overall Sketch of Deep Underground Coal Gasification



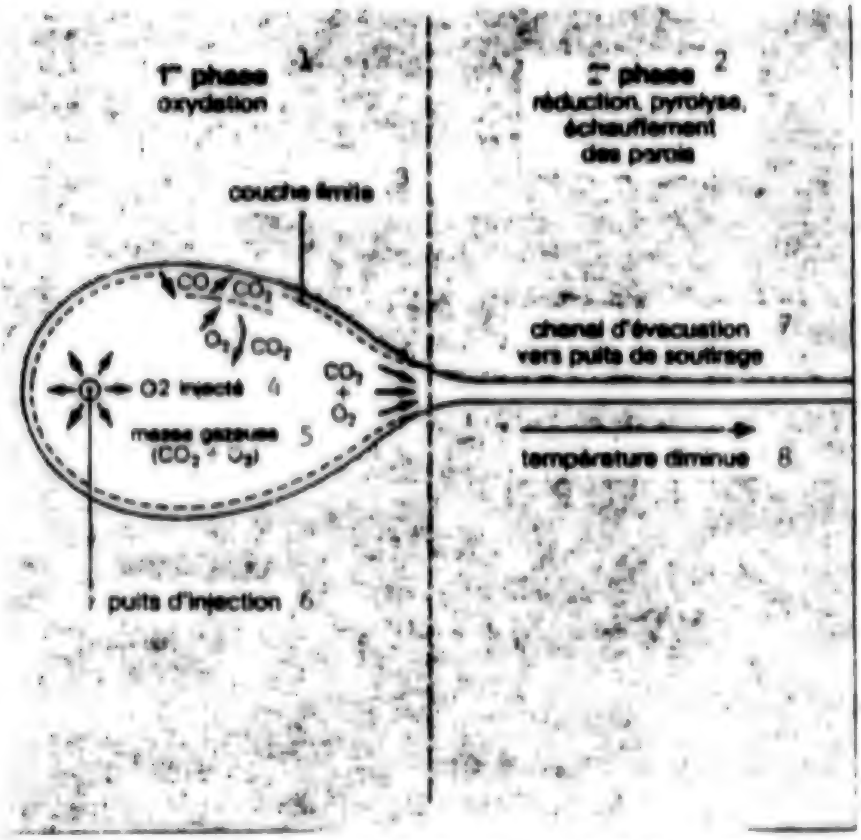
Key: 1. oxygen under pressure; 2. processing and methanization plant; 3. gas; 4. natural gas equivalent; 5. over 1,000 meters; 6. about 50 to 70 meters; 7. coal vein.

Laboratory Studies

Together with the on-the-spot experiments, experimental or theoretical laboratory studies were conducted in the various establishments of the agencies forming GEGS or assigned by them to specialized third parties.

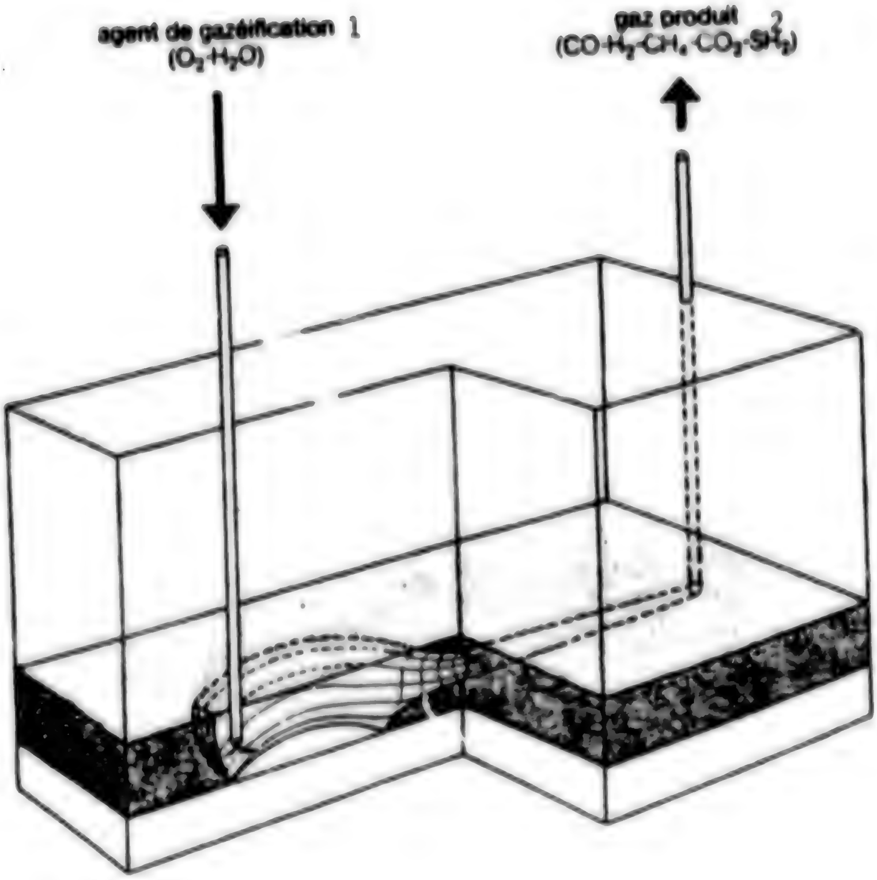
[Diagrams on next pages]

Gasification Process



Key: 1. 1st phase: oxidation; 2. 2nd phase: reduction, pyrolysis, heating of the walls; 3. limiting layer; 4. injected O_2; 5. gaseous mass; 6. injection shaft; 7. evacuation channel towards drawing-off shaft; 8. temperature decreases.

Gasification Operation Strictly Speaking



Key: 1. gasification agent; 2. gas produced.

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BRIEFS

ALCOHOL-FUEL PROGRAM--Non-petroleum fuels; the Swedish program. In Sweden, according to the objective the government has determined, a Swedish expert stated in Paris, non-petroleum synthetic fuels are to comprise 30 percent of automobile consumption 20 years from now. The Swedish program, mainly based on methanol, to be presented to Parliament 10 February, offers marked advantages, particularly for the increase in consumption and environment protection. According to a leader of the Swedish Methanol Company (SMAB), Mr Claes Pilo, the choice of methanol in Sweden is partly explained by the possibility of using a variety of raw materials, especially wood. A timetable for beginning the program has been planned: 1981-82, the publication of the decrees clearly stating the characteristics of the new fuel; 1981-1985, launching the M-15 (a mixture made up of 15 percent methanol and 85 percent hydrocarbons) and the marketing of cars adapted to this fuel and lastly, 1988, the launching of the M-100, for 100 percent methanol. Buses running on M-15 are already making their rounds in the Stockholm streets. The profits in consumption obtained as compared with the traditional fuels are from 2 to 3 percent, according to Mr Claes Pilo who took part in the discussion organized by the French Association of Petroleum Technicians. [Text] [Paris AFP SCIENCES in French 29 Jan 81 p 37] 8870

'COMES' ACTIVITIES REVIEWED--The Solar Energy Commission [COMES], established by Decree of 9 March 1978 and headed by Henry Durand, claims to be an "agency with objectives, an establishment with an international concern, responsible for programing, coordinating and financing activities undertaken by outside public or private organizations." Owing to its allocations that have increased appreciably (99.8 million francs in 1979; 199.3 million in 1981) and to an ample number of personnel, the policy of development of new sources of energy is now in an operational phase. The following are the major activity sectors: solar housing (premise heating, hot water supply), thermodynamics (Themis powerplant, Corsica powerplant at Vignola), photovoltaic conversion whose present plan should enable France to retain an important position on the world market, biomass (one of the first priorities, because over 30 million francs, or 15 times more than in 1979, are provided for research and development), the wind-power program (preparation of a technical plan and analysis of the potential market and participation in pilot operations in Polynesia, Cape Verde Islands, Senegal and Mauritania) solar meteorology, the DOM-TOM [Overseas Departments-Overseas Territories]: research and experimentation (water pumping, electricity supply), especially in Polynesia, New Caledonia, Reunion and French Guiana. [Text] [Paris SCOOP ENERGIE in French 15 Feb 81 p 9] 10042

CSO: 3102

INDUSTRIAL TECHNOLOGY

BRIEFS

GOVERNMENT LOANS FOR ROBOTICS--Within the framework of a package of 4.5 billion francs in long-term loans that the state is going to make available to enterprises in 1981, 1 billion will be for financing the development of robotics. These loans will be granted both to companies investing in research and production of national robotics and to companies providing themselves with this equipment. These loans, combined with interest rates 2 percent lower that the normal rate for the same kind of long-term loans, will have to be used to finance investments creating jobs, saving of raw materials, export capabilities and development of robotics. It should be noted that, last year, the state granted 5.7 billion in loans for enterprises. [Text] [Paris ELECTRONIQUE ACTUALITIES in French 23 Jan 81 p 4] 10042

CSO: 3102

SCIENCE POLICY

STRATEGY PLANNED TO DEVELOP BIOTECHNOLOGIES

Paris AFP SCIENCES in French 12 Feb 81 pp 1-6

[Text] Paris--An action plan for developing biotechnologies in France: A real action plan for developing biotechnologies in France, in order "not to lag behind the bioindustries," has just been worked out in the form of a report submitted to the government. This report, prepared at the request of the prime minister, is going to be available to French Documentation on 19 February 1981.

Some of the decisions made on 2 February in a limited Cabinet meeting in the Elysee Palace on life sciences and their applications are already inspired by this plan. This report, consisting of about 100 pages, entitled "Biotechnology, Tomorrow?", outlines an overall strategy and proposes specific measures, forming a battle plan for the next 20 years. It was drawn up by a working group, headed by Jean-Claude Pelissolo, former head of the Bureau of Electronic and Data-processing Industry (DIELI) in the Ministry of Industry, called on, last summer, by Pierre Aigrain, secretary of State for Research, for this special mission.

"At the dawn of the 21st century, these new activities of biotechnology are apt to be as important as, for example, data-processing is today, both because of the products to which they will give rise and because of the jobs that they will create," Pelissolo stated. He believes that "the appreciable delay taken by France in this field can be made up, if we act fast now with determination and intelligence."

With reference to a recent SEMA [Applied Mathematics Research Company] study, the report indicates that the world turnover for biological technologies should amount to 170 billion francs in 1990. "That is little on the world industry scale, but it is probably realistic, because 1990 represents only the start of a takeoff on the trajectory," the report points out. It adds that this turnover might exceed 400 billion francs by the end of the century, when this sector will reach its maturity.

Three consequences stem from this prediction, the document states:

[1.] Our delay can be made up, because the big race is only starting.

[2.] We have to be ready for a long-range effort, during which the shape of industry and trade risk being thoroughly modified several times. Therefore, it will constantly be necessary to adjust methods of action and involvement to the situation.

[3.] It would be very unwise to give priority right now to a given application line, because there will still be much uncertainty for a few years concerning the prospective chances of each one.

The report observes that, nevertheless, the following are the shortcomings noted in France:

Insufficient flexibility.

Excessive partitioning of the vertical structures.

Difficulty, even impossibility at times, of setting up joint evolutive structures.

Insufficient mobility of researchers.

Pelissolo gave some examples:

In genetic engineering: about 10 teams representing about 60 researchers, in the Pasteur Institute, in the CNRS [National Center for Scientific Research], in the university (Strasbourg), in the National Institute for Agronomic Research [INRA]

In microbiology: scattered research, very few teams up to world standards working on the physiology of microorganisms (Pasteur, Toulouse, INRA). This deficiency is recognized everywhere and must be regarded as one of the factors causing most concern. There is barely time to reverse the trend.

In enzymology: a sufficient number of fundamentalists, but very few specialists in enzymatic engineering and especially in fixed enzymes (Compiegne).

In biochemistry and reactor engineering: little research work in depth, with a few brilliant exceptions (Compiegne, Toulouse, Marseilles, INRA in Dijon).

Moreover, with regard to French industry, the report continues, it is still very little involved, as a whole, in biotechnology, owing, it seems, to three factors:

[1.] The great perplexity of the top-level officials with regard to an evolutive sector, difficult to understand, in which the potentialities are many but aleatory, and in which it is thought that the impasses will be burdened with consequences.

[2.] The difficulty of making reliable economic forecasts on the various lines. Instability of the price of raw materials (primarily of agricultural origin, sugars, corn, and so on), probable, but difficult to calculate, evolution of the productivity of the processes, fluctuation of the prices of the final products that they are seeking to replace (examples of fuels, soy proteins).

[3.] Insufficient knowledge of the new technologies on the part of company management teams.

In conclusion, in his report, Pelissolo draws up about 30 proposals and recommendations, in order to make it possible for bioindustries to get a start in France. The following are the most important ones:

The DGRST [General Delegation for Scientific and Technical Research] will set up a flexible instrument for measuring and following the evolution of research personnel in biotechnology in the public sector.

It will draw up, with the agencies concerned, a clear, uniform classification (direction marking) of the specialties involved.

Each agency will publish its personnel growth objectives, over a 5-year period, and will report them to the DGRST.

The results will be compared annually with the objectives and the objectives will be adjusted, if necessary, within the framework of a flexible programing.

For guidance, the document points out that the 6-percent annual rate advocated by the "biotechnology" working group, created in 1979 by the DGRST, would lead to a 34-percent increase in 5 years and an 80-percent increase in 10 years.

A qualified person, chosen in keeping with his teaching experience and his knowledge of the techniques required in biotechnology both in research and in industrial application will be put in the Ministry for Universities (Bureau of Higher Education).

His mission will be to advise the ministry on the establishment of posts of professors, assistant lecturers and laboratory assistants in the specialties involved. For this purpose, he will draw up a program strictly correlated with the program pertaining to an increase in research personnel.

A group established by the Ministry for Universities and consisting of representatives from universities, the professional engineering schools, industrialists and researchers will make proposals for modernizing the content of biotechnology instruction and for making it uniform.

The engineering schools, and most especially, the chemical and agronomic engineering schools, will be invited to increase their training in biotechnology. Cooperation between schools and between universities and schools will be encouraged. A short seminar consisting of university presidents and school heads will be arranged for this purpose.

The concrete steps taken by research agencies to participate in training or in refresher courses for biotechnology specialists will be encouraged and aided. In view of the projects, and if the need for it is felt, specific financing can be granted to them.

Development and modernization of instruction in biology and biochemistry in high-school classes preparing for the BTS [Upper-level Technician Diploma] and in the IUT [University Institute of Technology] will be accelerated. The Ministry of Education and the Ministry for Universities will see to it that industrial applications are given priority in this instruction and they will set up appropriate equipment facilities.

The DGRST, in liaison with the Ministry of Foreign Affairs and the Ministry for Universities, will set up, by setting existing procedures in motion, a special incentive mechanism for placing French trainees in the third cycle in the best foreign univerisity biotechnology laboratories for the purpose of awarding about 30 scholarships a year. Extensive publicity will be given to this initiative.

A special fund for receiving foreign specialists in biotechnology in public research agencies will be set up by DGRST. It will increase the resources allocated by those agencies, in order to enable them to offer those researchers acceptable living and remuneration conditions.

Establishment of transfer centers whose creation has been decided on by the government will be accelerated. French industrialists will be encouraged to provide themselves with supplementary means.

It would be advisable to make researchers aware, concretely and illustratively, of the precautions to be taken in the field of patent rights, by means of a campaign that might bring together in association the leading public research agencies in the sector (Pasteur, INRS [National Institute of Scientific Research], CNRS).

In addition, a working group should be established that will bring together in association representatives of the ministries concerned (Research, Industry, Agriculture, Universities) and of industrial sectors invovled (chemistry, pharmacy, agriculture-food products), in order to draw up a definite, precise doctrine on the problems of patents in biotechnology that might serve as a basis for steps to be taken by France with regard to international authorities.

Very special concern should be devoted by the public authorities to the following:

The most aggressive projects.

Those projects aiming at filling the most serious gaps in the industrial apparatus.

In this connection, Pelissolo's report points out the "regrettable lack" of the following:

A French enzyme industry. This deficiency can be filled only by participating in foreign enterprises. Therefore, quick action should be taken, because the opportunities are going to become more and more rare.

Microorganism banks. Even if the projects that can be envisaged are "borne" by public agencies, the industrialists have to become associated in them in one way or another.

Computerized data banks. The report also proposes to initiate a certain number of pilot programs, including the following listed by way of example:

Nitrogen fixation by grains.
Cellulolysis.
Direct bioconversion by water photolysis.
Production of hybridomes by monoclonal antibodies.
A research program to determine the best performing strains for transforming sugars into alcohols.
Improvement and automation of fixed enzyme reactors.
Mass culture of animal and plant cells.

Finally, a proposal was made for establishing an interministerial biotechnology mission whose role will be to organize and encourage the national effort in this field by mobilizing ability and resources wherever they may be.

Its principal missions will be the following:

Make a constant technical-economic evaluation of biotechnology and of its lines of application.

Periodically update, on the basis of this evaluation, the objectives of the action and means to be set in motion.

Propose a choice of pilot programs and assist in setting them up.

Evaluate social impact and provide the various categories concerned with necessary information.

Follow through on implementation of the proposals as the sector develops and in terms of the experience acquired.

The report points out that it is recommended that the interministerial biotechnology mission be provided with a budget on the order of 20 percent of the total incentive allocations apt to be granted to this sector.

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CSO: 3102

STRUCTURE, BUDGET OF CENTRAL RESEARCH ORGAN OUTLINED

Paris LE MONDE in French 24, 26 Feb 81

[Article by Xavier Weeger]

[26 Feb 81 p 14: Outline of Organization]

[Excerpt] A Pyramidal Organization

The reform of 1979 profoundly changed the CNRS [National Center for Scientific Research] structures and installed a new administration.

At the top of the pyramid there is a five-person council which deliberates upon important questions, notably the budget and the creating, changing and abolishing of research organizations. These deliberations are subject to veto by the minister of Universities, who exercises his supervision as part of the CNRS.

The institution is directed by a director general. He has an administrative staff ("management committee") comprised of the secretary general, scientific advisers, the directors of the national institutes and the scientific directors; each of the latter directs a department (the present departments cover basic physics and mathematics; physical science for the engineer; chemistry; the science of the earth, of the ocean, of the atmosphere and of space; the social and human sciences). On scientific questions, the director general consults the scientific committee, which is comprised of six scientific members of the council and 10 chairmen of sections of the national committee. On general personnel problems, he consults an advisory personnel committee on which the various categories of personnel employed by the center are represented.

The national committee, which is currently organized into 41 sections made up of persons who are appointed (8 per section) and elected persons (15 per section), gives its opinion on the work of the researchers and the research organizations. For each department there is a sectoral committee made up of the "appointed persons" and the chairmen of the sections that are part of the department.

[24 Feb 81 pp 1, 17: CNRS Budget for 1981]

[Excerpt] A 4.51-Billion Budget

The 1981 budget of the CNRS group* totals 4.51 billion francs in operating credits and program authorizations (4.49 billion in operating credits and payment credits). The chart reproduced below shows the distribution, according to scientific sectors, of the sums directly allotted to research (3.80 billion). The remainder goes for general services (administration) and "indirect means" (computation centers, documentation centers, external relations, missions, publications, social action, continuing training).

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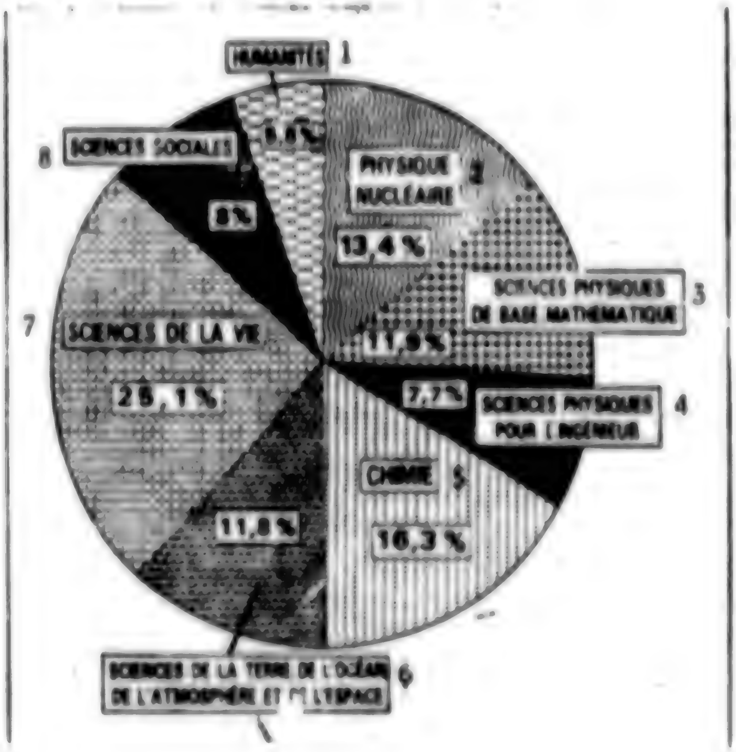
*There are two national institutes in the CNRS, the National Astronomy and Geophysics Institute (INAG) and the National Nuclear Physics and Particle Physics Institute (IN2P3), which are evolving relatively autonomously. On the other hand the CNRS



Key:

1. Humanities
2. Nuclear physics
3. Basic physical science, mathematics
4. Physical science for engineering
5. Chemistry
6. Earth, ocean, atmosphere and space sciences
7. Life sciences
8. Social sciences

In 1981, the total number of personnel in the CNRS accounts for 23,099 budgetary positions. Of this number, 8,875 are researcher positions, divided into the following four grades: research assistants (1,827); research lecturers (4,693); research teachers (1,854); and research directors (501). Of the budgetary positions, 13,024 participates in privately-owned companies, most often in developing and operating, jointly with [words omitted], especially foreign--"large instruments or installations" (telescopes, reactors, etc.)

are distributed as follows: engineers (2,803); technicians (8,315); and administrative positions (1,906).

The research organizations supported by the CNRS are of two kinds: its own organizations, created by the organ, and associated organizations, outside the organ but connected with it contractually. Its own organizations may be specific laboratories (there were 157 at the end of 1980), research groups (35) or research teams (132). The associated organizations are associated laboratories (246) or associated research teams (595). Under the latter category, on the other hand, is individual aid (530) given to persons working in laboratories or alone (for example in mathematics or in social and human sciences).

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TRANSPORTATION

HIGH-SPEED TRAIN SETS WORLD RECORD AT 380 KM/HR

Paris LE FIGARO in French 27 Feb 81 p 12

[Article by Pierre Kerlouegan: "Importance of Braking"]

[Text] World record for a production-line train of the high-speed train (TGV). Yesterday afternoon, it reached a speed of 380 kilometers an hour somewhere between Montchanin and Saint-Florentin, on a section of the new Paris-Sud-Est track. Thus, it beat by very far the record of 331 kilometers an hour already held by the SNCF [French National Railroads] since 28 March 1955. On that day, in Les Landes, two production-line electric locomotives in tandem, the BB 9004 and the CC 7107, gave France this railroad blue ribbon. This exploit, which had been carefully prepared for several months (our 3 September editions), is a remarkable preview for the high-speed train whose placing in service between Paris and Lyons is scheduled for 27 September, the day when winter time schedules go into effect.

Twenty-six years to win a speed record! This long period of time tells volumes about the difficulty encountered at present to make trains run faster and faster. And, nevertheless, that old feat of arms was probably only a flash in the pan, because it announced an appreciable increase in speeds on commercial service.

In this connection, it should be recalled that as early as 1967 the Capitole became the first train in the world to run regularly at 200 kilometers an hour. Four years later, the Aquitaine and the Etendard were doing to same on the Paris-Bordeaux line on which, for 4 months now, a Coral 1st-class and 2nd-class tain, the Montaigne, has been connecting the two cities at the same speed.

Today, most of the fast trains of the SNCF travel at 160 kilometers an hour and every day 37,000 kilometers of the network are traveled over at an average of over 130 kilometers an hour. Tomorrow, that is to say in 7 months, the high-speed train will run between Paris and Lyons at 260 kilometers an hour.

In order for a world speed record on rail to be confirmed, it should be established or beaten by a traditional train running on traditional tracks. Although this regulation excludes air cushion trains or trains using magnetic levitation from competition, on the other hand, in spite of its futuristic appearance, the TGV is still a train, but an improved train running on especially designed tracks to allow an average speed greater than 200 kilometers an hour between stations.

Let us take a little closer look at those new tracks that start at Combs-la-Ville, 29 kilometers south of Paris, and end at Sathonay, 8 kilometers from Lyon-Brotteaux, or a distance of 389 kilometers.

Its rectilinear design is, without question, its main characteristic. In order to enable the train to run without having to brake, the curves that could not be avoided are very wide, because none of them has a radius of less than 4,000 meters. On the other hand, because the new tracks are not intended for freight trains, which are heavy, they include grades as steep as 3.5 percent, compared with 1 percent at the most for traditional tracks.

In order to stand up under the repeated passage of high-speed trains, the SNCF had to take constraining measures for preparing the roadbed and engineering structures, very numerous between Combs-la-Ville and Sathonay, because the tracks have no level crossing and no tunnel.

That is why is was necessary to build nine viaducts, 222 rail bridges, 176 road bridges and 89 waterway bridges. Fifty million cubic meters of earth were moved to make embankments and excavations. Close to 170,000 cubic meters of concrete were poured for the engineering structures that also needed 150,000 metric tons of steel.

With regard to the trains -- that run on welded rails -- they are the result of long experimentation with a prototype whose trials started 9 years ago in Les Landes. The production-line trains that will be placed in service this autumn and, among them, the record-making train, are an advanced stage of railroad technology in the world and differ considerably, in their design, from even the most recent cars and trains, like the ones of the Coral type.

First of all, each train is an inseparable unit of eight cars headed by two electric locomotives with aerodynamic lines each equipped with six motors, or a total power of 8,560 horsepower. This power, together with the train's adherence qualities to the rails and the kinetic energy released by 420 tons hurled at a speed of 260 kilometers an hour, enables the TGV to climb the steep grades on the new line without slowing.

Whoever says high speed, says effective braking. A triple system was developed: rheostatic electric brake, disk brakes, brakeshoes. This system guarantees stopping in 3,500 meters at the spped of 260 kilometers an hours and in 1,300 meters at 180 kilometers an hour, which will be the speed of the trains when they leave the new line to run on the traditional line beyond Lyons.

Safety also relies on many other components, especially automatic signaling on the instrument panel of the electric locomotive. In case it exceeds the authorized speed, automatic devices replace the engineer and brake the train, even stopping it in case of human failure.

Eighty-seven trains of this type -- 111 first-class seat, 275 second-class seats -- have been ordered by the SNCF, which has already placed some in service on the Paris-Dijon-Lyons line, in order to acquire familiarity today with tomorrow's train.

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TRANSPORTATION

EEC GROUP STUDIES JAPANESE PENETRATION OF AUTO MARKET

Paris L'ARGUS DE L'AUTOMOBILE in French 16 Oct 80 p 7

[Article: "European Manufacturers Facing Japanese Industry"]

[Text] The CCMC (Common Market Manufacturers' Committee) met on the eve of the Paris Automobile Show. This meeting, devoted particularly to the Japanese "thrust" into Europe, resulted in the following joint statement:

"Since its statement issued at the end of June 1980, the Common Market Manufacturer's Committee has continued to observe the increase in sales of Japanese cars. It has noticed that these sales have continued to advance in western Europe, the United States of America and in many other markets. Whereas in nearly all of the other manufacturing countries production has decreased more or less steeply, that of Japanese automobiles increased by approximately 20 percent in the first half of 1980 with respect to the first half of 1979. This increase in production went entirely into exports, which rose from 30 to 40 percent.

"At the same time, Japanese imports, which had been only 2 percent of its exports in 1979, decreased further during 1980. At the present rate, Japan will have exported 80 times as many cars by the end of 1980 as it will have imported.

"The working group which the CCMC had established under the aegis of Umberto Agnelli, chairman of its board of directors, has examined the reasons for this state of affairs.

"In the first place, it noticed that, while in the United States the growth of Japanese sales was explained largely by the fact that domestic production was not in a position to satisfy the needs of consumers, who have become less and less inclined to purchase big cars that consume a great deal of fuel, the situation is not the same in Europe, where the manufacturers offer their customers a very wide and diversified variety of high quality automobiles that are capable of meeting their requirements. With particular regard to fuel consumption, the range of European models are generally more economical than their Japanese counterparts and, in general, the European cars offer services that are superior to those of their Japanese competitors.

"Therefore, it is not on technical superiority that the Japanese manufacturers base their advancement. They attract their customers essentially by an aggressive policy with regard to prices and through the marketing medium. "The opportunity of adopting such a policy is furnished to the Japanese by the fact that the FOB prices of their products at the factory in dollars are much lower than they are for the European products. This difference is explained as follows:

Tax and financing advantages.

A lower cost per hour of labor.

The undervaluation of the yen.

"With regard to the undeniable tax and financing advantages enjoyed by the Japanese companies, the Common Market Automobile Manufacturers' Committee desires that the Commission of the European Econonic Communities conduct a thorough investigation and publish its findings.

"Contrary to popular opinion, the low production costs of Japanese firms are not due to the fact that their installations are operated more efficiently than those of the European companies. These low production costs are due to the fact that Japanese installations are used for longer periods during the year than is the case for European factories, that the Japanese work longer hours, that the Japanese take shorter vacations, have less absenteeism and fewer strikes or lockouts that would shut down production lines. Furthermore, salaries are lower in Japan, particularly those paid by suppliers and subcontractors. Also, the expenses incurred by Japanese manufacturers for social fringe benefits for the workers are much lower.

"While considering that it is indispensable for social relations in Europe to be distinguished to a greater degree by a joint resolve to employ the available installations more rationally and productively and that it would be inopportune to take new measures that would run counter to this objective, the CCMC believes that, in the area of social organization in the broad sense of the term, Japan is far behind the times and that much social progress remains to be accomplished.

"Undervaluation of the yen particularly benefits a number of deliberately selected Japanese industrial sectors, such as the automobile industry, which, within the framework of a strategy of concerted conquest by all of the beneficiaries, employ monetary fluctuations to entrench themselves in a given market, without seeming to concern themselves about the organizational problems that they could generate. It is astonishing to observe the relation that exists between the decline of the yen and the upswing in Japanese sales within these markets. "The CCMC believes that, if the Japanese offensive in Europe continues at the present rate, the future of the European automobile industry may become very difficult. In such a case, labor would be seriously threatened. Through its automobile industry, which play an important role in its economy, a good part of Europe's industrial vitality would be affected, not only because the mechanical sector would be involved, but also because the steel industry, the manufacturers of machine tools and automatic equipment, the glass industry, the tire manufacturers and many others would be affected.

"As for the manufacturers who belong to the CCMC and who subscribe to freedom of exchange under normal conditions, they are doing everything in their power to resist the Japanese offensive, particularly by seeking higher production and technical progress with regard to their vehicles in order to maintain their margin of superiority. Nevertheless, they believe that it is time to inform the Commission of the European Communities and the governments of its member states of the actual facts of the present situation.

In conclusion, the Common Market Automobile Manufacturers' Committee decided to confer as soon as possible with the Japanese manufacturers concerning all of these problems."

It should be pointed out that the Common Market Manufacturers' Committee includes 12 automobile companies which are represented by their presidents--managing directors who sit on the board of directors. The list is given below:

Germany: Messrs Von Kuenheim (BMW), Prinz (Daimler-Benz), Voisard (Man) and Schmucker (Volkswagen).

France: Messrs Lombard (Citreon), Boillot (Peugeot) and Vernier-Palliez (Renault).

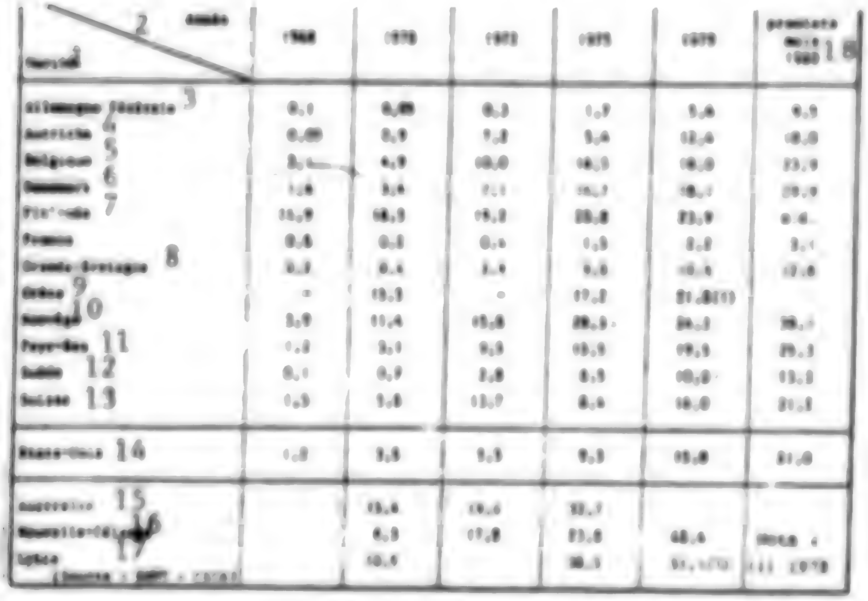
Italy: Messrs Massacesi (Alfa Romero) and Umberto Agnelli (Fiat), now president of the Committee for the period 1980-1981.

Netherlands: Messrs Van Doorne (Daf Trucks) and Gyllenhammar (Volvo Car).

United Kingdom: Mr Edwardes (British Leyland).

The general secretariat is represented by Mr Marc Ouin, vice-president and delegate of the Stock Exchange of the French automobile manufacturers. At the last meeting, Mr Jean-Paul Parayre represented Peugeot and Citroen. The presidents of Man, Regie Renault and Volvo Car did not participate at this meeting.

Japanese Penetration of Various Markets from 1968 to 1980.
(in percent of registrations of new cars)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(1) Markets
(2) Year
(3) West Germany
(4) Austria
(5) Belgium
(6) Denmark
(7) Finland
(8) Great Britain
(9) Greece
(10) Norway
(11) Netherlands
(12) Sweden
(13) Switzerland
(14) United States
(15) Australia
(16) New Zealand
(17) Libya
(18) First few months of 1980

Note: [Replace all commas in numbers by decimal points.]

7619
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TRANSPORTATION

NEED FOR CONTROL OF AUTOMOBILE NOISE POLLUTION RECOGNIZED

Paris L'ARGUS DE L'AUTOMOBILE in French 8 Jan 81 p 27

[Article: "Automobile Noise: The Automobile is Among the Defendants"]

> [Text] Noise, a nuisance of modern times, particularly affects city dwellers as well as workers and employees working in shops, where this discomfort sometimes combines with pollution of the surrounding air. The number of noise victims in France amounts to hundreds of thousands. Thus, in the Paris region alone, where one-fifth of the country's entire population dwells, it is estimated that some 300,000 people who live along the major high traffic roads feel the noise to the point of having their sleep, and even their health, disturbed.

According to the minister of the environment, the steady increase in the number of motor vehicles has already made it necessary to adopt antinoise measures without which use of automobiles would lead to an unacceptable degree of deterioration of the quality of life in urban areas.

As can be seen, the automobile is among the list of defendants, a defendant which would remain mute without the real cause of the trouble--the automobile driver--and, in the case of the two-wheeled vehicle, the motorcyclist and the moped driver.

Still No Regulations Against Pollution

Strangely enough, noise is a plague against which regulation has remained, so to speak, mute. There are laws that protect the water and the air as well as those dealing with garbage disposal. Nevertheless, a gap exists with regard to noise, in opposition to which the government has undoubtedly prepared a bill but has so far postponed its discussion in Parliament.

To be sure, antinoise measurements do exist. The facades of buildings newly constructed at the edges of noisy roads must satisfy standards of sound insulation decreed by administrative edicts dating back to October and November 1978. Automobiles, buses, industrial vehicles and motorcycles must not emit (according to their categories) more than a given number of decibels. However, these measures, like many others concerning noise, have been taken independently of of each other without a master plan emanating from a single source of inspiration and execution.

Would you like to have proof of this? Three different ministries share the appropriations allotted to the fight against noise: the Ministry of the Environment with an annual endowment of approximately Fr 1.5 million assigned for research; the Ministry of Transportation which devotes an average of Fr 50 million per year to installations such as antinoise screens and finally, the Ministry of the Interior which, an administrator of protection for local communities, spends a small percentage of its budget for improving the quality of life for their benefit.

Each Decibel of Decrease in Noise Level, Increases Vehicle Cost by One Percent

Returning to the subject of the automobile and taking into account the predictable growth of the number of vehicles in use in the years to come, it would be advisable, if only to maintain noise at its present level, to decrease by several decibels more the permissible sound level emitted by surface motorized vehicles.

While the standards in force since 1 April 1980 have been met without requiring manufacturers to invest large amounts for this purpose, now it would no longer be so since each decibel of decrease in noise level would increase the cost of the vehicle by one percent. Furthermore, the automobile manufacturers, who in recent years have been requested by the public authorities to significantly improve safety and carburation (which greatly increases manufacturing costs), would cast a jaundiced eye on any new factor that would increase their costs, especially since business in the new car market is very sluggish at the present time.

With regard to motorcycles, France has suggested to its European partners the adoption of stricter noise standards to be effective by 1 June 1981. Meanwhile, without waiting for any replies to the French proposal, a decree to appear soon should provide stricter regulation of the exhaust noise of machines traveling on all kinds of terrain.

However, legislating is one thing and enforcing the law is quite another. For the purpose of watching over 22 million four-wheeled vehicles and 675,000 motorcycles, the public authorities have available only 250 policemen distributed among 83 squads. There also exists a scarcity of facilities, in spite of which a total of 600,000 vehicles were inspected and 85,000 traffic tickets were issued during 1979.

A Colloquium in February

Will the new year usher in a new step in the struggle against noise? Already, the Ministry of the Environment has announced the organization of a colloquium which will be held on this subject during February at Compiegne. Five workshops are planned, including one dealing with highway vehicles alone.

The objective of this colloquium is to prepare an inventory of noise sources, to make a list of all the measures taken against noise up to now and to determine the areas in which research should be conducted in the fight against noise. The work performed during the colloquium will be reported in a White Book to be published in the spring.

Noise in the Days of the Horse-Driven Carriage

Before the era of the automobile, horse-drawn carriages also used to generate noise. The metal attached to the outside rim of the wheels and the horseshoes resounded to such a point on the paving stones that, in the city (particularly in Paris), it was the custom to spread piles of straw on the roadway in front of those buildings where seriously sick individuals were struggling to overcome their illness.

Noise: the Cry of the Associations

Jean-Claude Delarue, president of SOS Environment and leader of the national movement for taking action against noise, denounces the laxity of public authorities who, according to him, do not enforce the antinoise laws and regulations.

In fact, according to Mr Delarue, if more than 50 percent of the French public which suffers from the noise, blames surface transportation, it is particularly because 30 to 40 percent of the "two-wheeled motorized vehicles" have had their exhaust mufflers disconnected which means that the authorities are not doing their job.

Another grievance: The system of divided highways and fast urban roads has been greatly expanded without exhibiting any concern for the riverside dwellers. Furthermore, the government doesn't seem to show the slightest sign of repentance. Only Fr 63 millions have been allotted to the highway department for protection of the riverside dwellers from these roads although a total of Fr 8 billion is really necessary. At this rate, it will take 125 years to solve the problem.

Thus, priority has been accorded to heavy trucks, which now account for 50 percent of the transportation of merchandise as compared with 15 percent 20 years ago, without taking sufficient precautions to protect the many communities which are now incessantly subjected to the nuisance of traffic noise day and night.

Finally, Mr Delarue reproaches the Highway Administration of inflicting noise levels of up to 70 decibels along fast urban roads.

Among the antinoise measures recommended by the president of SOS Environment, we note the following:

Developing foolproof mufflers which cannot be deactivated by users of motorcycles and mopeds.

Initiating a work program to protect the victims of noise caused by large transportation systems as well as the inhabitants of communities traversed by national highways with high traffic density.

Studying the vehicle standards that have been adopted by Switzerland for 1982 and 1986 as well as the standards proposed to the European Economic Commission by the West German government.

The associations also request that priority be given to the less noisy means of transportation, which also happen to be safer and less voracious with regard to expenditure of energy and space, such as: walking, use of bicycles, mass transit in the cities and railroads rather than truck lines for transportation of merchandise.

Limiting nocturnal traffic of heavy trucks for reasons of safety as well as to safeguard the tranquility of inhabitants.

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